



Ascarid

Ascarid for Dog Last updated:

Nov 1, 2016

Synopsis

CAPC Recommends

CAPC recommends testing all dogs for ascarids by fecal flotation with [centrifugation](#). Fecal tests for specific parasite antigens have been optimized for use in companion animals and are also available to aid in identification of infection.

Puppies should be tested more frequently than adult dogs. CAPC recommends testing for intestinal parasites, including ascarids, at least four times in the first year of life and at least two times per year in adults depending on patient health and lifestyle factors.

Puppies should be given anthelmintics starting at 2 weeks of age and repeating every 2 weeks until regular broad-spectrum parasite control begins, and adult pets should receive year-round broad-spectrum parasite control with efficacy against ascarids.

Feces should be immediately picked up when walking a dog in a public area, picked up from the yard on a daily basis, and sandboxes, garden areas, and playgrounds should be protected from fecal contamination.

Species

Toxocara canis

Toxascaris leonina

*[Click here](#) for recommendations on *Baylisascaris*

Overview of Life Cycle

Dogs become infected with ascarids via ingestion of larvated eggs from a contaminated environment and ingestion of other vertebrate hosts that have consumed larvated eggs and thus have larvae in their tissues. Transplacental transmission of larvae from the bitch to the fetal pups in utero is an important route of infection for *T. canis*. However, transplacental transmission has not been shown to occur in *Toxascaris leonina*.

Migration of larval ascarids within the host is complex. Following acquisition, larvae of *Toxocara* spp. migrate through the liver and lungs, are carried up the mucociliary apparatus, and then are swallowed to develop in the small intestine. When this migration occurs in fetal pups, the migrating larvae wait in the liver and lungs until the pups are born, at which time they resume their migration across the lungs to the airways.

Larvae acquired from ingestion of vertebrate tissues do not migrate in the dog definitive host, but instead travel to the small intestine to become adult worms.

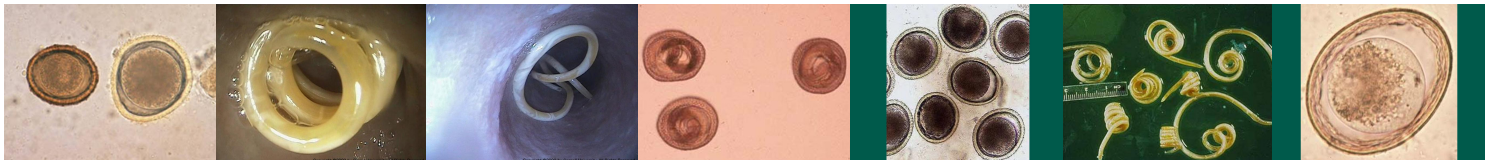
Toxascaris leonina is different from *Toxocara* spp. in that migration outside the intestinal tract does not occur.

Stages

Nonembryonated ascarid eggs are passed in the feces of an infected dog; the most commonly seen species are *T. canis* in the dog. Infective, larvated eggs of *Toxocara* spp. are found in fecal-contaminated soil.

Adult ascarids in the small intestine of the infected dog can be identified by their size, stout appearance, and the presence of three lips on the anterior end.

The alae on *T. canis* are broader than those of *Toxascaris leonina*. The tail of the male of *T. canis* has finger-like projections not present on *Toxascaris leonina*. In the case of the female, the easiest way to tell the two apart is by breaking open the female and differentiating the eggs.



Baylisascaris procyonis egg on left, *T. canis* on right

T. canis coiled in si

T. canis contorted in jejunum

Toxocara canis eggs, larvated

Toxocara canis eggs, unlarvated

Toxocara spp. Adult

Toxascaris leonina egg

Disease

Disease in dogs caused by infection with *T. canis* is most severe in young pups. This parasite is observed less commonly in dogs more than one year of age.

Adult dogs—even dogs that are infected in the uterus of an infected dam—can be repeatedly infected with adult *T. canis* if they are orally infected with a few (25 to 100) infective eggs.

Pups infected in utero may present with ill thrift, failure to gain weight, and a poor hair coat; a pot-bellied appearance is also commonly observed. Severe infections in neonatal pups can result in acute death at a few days of age as large numbers of larvae that were acquired in utero cross the alveoli en route to the small intestine. Pups with heavy infections may expel a large mass of worms in vomitus at 4 to 6 months of age; this phenomenon can cause distress for the client as the worms are large and usually alive when expelled.

Infections with adult *Toxascaris leonina* have not been commonly associated with clinical disease in dogs. However, treatment is still warranted.

t canis on retraction



Prevalence

Toxocara spp. are extremely common parasites of dogs and cats throughout the world. Surveys using samples collected from across the United States show that more than 30% of dogs younger than 6 months of age are shedding *T. canis* eggs, and some studies have shown that virtually all pups are born infected with *T. canis*.

The ability of *Toxocara canis* to be transmitted from the dam to the fetal offspring, together with the hardy nature of larvated eggs in a contaminated environment, contribute to the high prevalence of infection even among pets that are well cared for and routinely treated for intestinal parasites. Because somatic infection is very common in adult dogs (even those on routine monthly intestinal parasite control), veterinarians should assume that essentially every pup is likely to harbor developing ascarids in the small intestine, and thus young animals should be routinely dewormed for *Toxocara* spp. (see Treatment below).

Although infection rates are likely to be higher in pets kept outdoors or allowed to consume prey species that may harbor larvae in their tissues, infection with *Toxocara* spp. is common in all dogs.

The geographic distribution of *Toxascaris leonina* is more focal in nature than that of *Toxocara* spp., and infection with *Toxascaris leonina* occurs less frequently. However, this parasite is still widespread in dog populations.

[Click here to view our Prevalence Maps](#) and to sign up for updates on reported cases in your area

Host Associations and Transmission Between Hosts

Dogs become infected with ascarids upon ingestion of larvated eggs from a contaminated environment and ingestion of larvae in tissues of vertebrate hosts.

Earthworms and possibly other invertebrate paratenic hosts can harbor larvae from eggs in the soil that can then be passed by ingestion to both paratenic (birds and rodents), and perhaps also to the final host, i.e., the dog.

A wide variety of vertebrate hosts can harbor ascarid infections, and infection is common in dogs that consume prey species.

Transmission of *Toxocara canis* occurs directly from mother to puppies through the placenta. Many of the *T. canis* larvae ingested by adult dogs become arrested in somatic tissues. If arrested *T. canis* larvae are present in an intact female that becomes pregnant, the larvae are activated to resume migration late in pregnancy, making their way across the placenta to infect pups.

Prepatent Period and Environmental Factors

The prepatent period of *T. canis* varies from 2 to 4 weeks, depending on how larvae are acquired. Pups infected in utero will not shed eggs before 2.5 to 3 weeks of age. Worms acquired after birth from ingestion of larvated eggs from the environment will become adults and begin passing eggs into the environment approximately 4 weeks after exposure. However, larvae acquired via ingestion of infected vertebrate hosts may develop into adults in as little as 2 weeks.

Similar variation is seen in the other ascarid species, but in general, the prepatent period of *Toxascaris leonina* is approximately 8 to 10 weeks.

Most ascarid eggs require 2 to 4 weeks in the environment to larvate and develop to the infective stage. *Toxascaris leonina* is the exception; eggs of *Toxascaris leonina* become infective as soon as 1 week after being shed. Because of the time required, fecal material has often broken down before the eggs are infective, and thus there is often no gross evidence that the environment is contaminated with ascarid eggs. However, once present, ascarid eggs are hardy and can survive and remain infective for years.

Removing eggs from a contaminated environment is difficult, and common disinfectants are not effective at killing them. Strict adherence to leash laws and prompt removal of feces from the environment are essential aids in the prevention of ascarid infections. Preventing environmental contamination by routinely deworming infected animals before the infections become patent is another key component in achieving effective control (see Control and Prevention below).

Site of Infection and Pathogenesis

Upon infection, larvae of *Toxocara* spp. undergo an extensive migration through the liver and lung before making their way back to the small intestine to develop into adult worms.

Focal scarring associated with larval ascarid migration may be evident in the liver at necropsy, but clinical disease because of this hepatic migration rarely, if ever, occurs.

In contrast, the hemorrhage and inflammation that occur in response to the traumatic migration of larvae across the pulmonary alveoli may result in overt pulmonary disease, particularly in young pups that acquired a large number of larvae from the bitch in utero.

Adult ascarids in the small intestine of dogs may cause a mucoid enteritis and occasionally a mild diarrhea. Although dramatic cases of intestinal obstruction and intussusception associated with large numbers of ascarids in the small intestine have been reported, such sequelae are relatively rare.

Adult ascarids that migrate to the stomach may cause irritation of the gastric mucosa that results in vomiting.

t canis in duodenum



Diagnosis

CAPC recommends testing all dogs for ascarids by fecal flotation with [centrifugation](#). Fecal tests for specific parasite antigens combined with centrifugal fecal flotation in companion animals has been shown to aid in identification of infection. The combination of tests may aid in identification of ascarids where few to no eggs are recovered from a fecal sample due to few adult worms being present, an infection with only young worms, or single sex infections.

Puppies should be tested more frequently than adult dogs. CAPC recommends testing for intestinal parasites, including ascarids, at least four times in the first year of life and at least two times per year in adults depending on patient health and lifestyle factors.

Dogs of any age may have subclinical infections and show no signs of disease. However, when ascarid infections are allowed to persist, contamination of the environment with these potentially zoonotic parasites can occur.

Adult ascarids may be recovered from the vomitus of an infected dog. The nematodes can be identified as ascarids by their large size, light tan color, and the presence of three prominent lips on the anterior end.

Fecal flotation with centrifugation

Diagnosis of patent ascarid infections via fecal flotation is straightforward. Ascarids are prolific egg producers and the eggs float readily in most flotation solutions. A single adult *T. canis* can produce as many as 85,000 eggs per day, and eggs are morphologically distinct, making identification of eggs in feces unambiguous.

Mix 1 to 5 g feces and 10 ml of flotation solution (ZnSO₄ sp.gr. 1.18; sugar sp. gr. 1.25) and filter/strain into a 15-ml centrifuge tube.

Top off with flotation solution to form a slightly positive meniscus, add coverslip, and centrifuge for 5 minutes at 1500 to 2000 rpm.

Examine for characteristic eggs.

Eggs of *Toxocara* spp. can be readily differentiated from those of *Toxascaris leonina* (see images under Stages).

Toxocara canis: 85-90µ x 75µ, dark embryo, rough outer shell wall

Toxascaris leonina: 75-85µ x 60-75µ, lighter embryo, smooth outer shell wall, internal surface of shell wall is wavy

Eggs of *Toxocara* spp. also resemble those of *Baylisascaris procyonis*, an ascarid of raccoons that occasionally infects dogs. [Click here](#) for recommendations on *Baylisascaris*

Baylisascaris procyonis: 63-75µ x 53-60µ, dark brown, finely granular shell wall

Coprophagia is common in dogs and ascarid eggs from other hosts may be present.

Fecal test for ascarid antigen

Commercial assays are used for the detection of antigen produced by immature and adult ascarids in the lumen of the small intestine. Both male and female worms can be detected, and antigen production is not linked to egg production.

Diagnosis by detection of antigen allows identification of prepatent and single sex infections, supporting use of preventives and allowing earlier treatment.

Both centrifugal fecal flotation and fecal antigen tests have their strengths and weaknesses, however to ensure the widest breadth of detection of intestinal parasites in dogs, fecal tests for antigen should be combined with microscopic examination of feces for eggs.

Treatment

Fenbendazole, milbemycin oxime, moxidectin, and pyrantel pamoate are approved for the treatment of ascarid (*T. canis*, *T. cati*, and/or *Toxascaris leonina*) infections in dogs. Pyrantel is approved, in combinations with ivermectin or ivermectin and praziquantel, for treatment of *T. canis* and *Toxascaris leonina* infections in dogs. Febantel is approved, in combination with pyrantel and praziquantel, for treatment of *T. canis* and *Toxascaris leonina* infections in dogs.

Piperazine is also approved for treatment of ascarids in dogs but may have a lower efficacy than other available products.

Pyrantel is available in a highly palatable liquid formulation that is readily administered to nursing animals and thus may be considered the preferred treatment for very young pups.

To prevent environmental contamination, all pups should be routinely treated with pyrantel pamoate at 2, 4, 6, and 8 weeks of age and then placed on a monthly preventive with efficacy against *Toxocara* spp.

Nursing dams should be treated for ascarids at the same time as their litters.

Pregnant bitches may be treated during pregnancy with daily fenbendazole or 2 to 4 times with a high dose of ivermectin to prevent transplacental and transmammary transmission of *T. canis* larvae to the pups. Both protocols involve the off-label use of anthelmintics.

Toxocara canis: the following products are approved for the treatment of adult *T. canis* infections in dogs:

Advantage Multi® Topical Solution for Dogs (imidacloprid + moxidectin) (Bayer Animal Health)

Coraxis™ Topical Solution for Dogs (moxidectin) (Bayer Animal Health)*

Drontal® Plus Tablets (praziquantel/pyrantel pamoate/febantel) (Bayer Animal Health)

Drontal® Plus Taste Tabs® (praziquantel/pyrantel pamoate/febantel) (Bayer Animal Health)

HEARTGARD® Plus Chewables for Dogs (ivermectin/pyrantel) (Merial)

HeartShield™ Plus Flavored Chewables (ivermectin/pyrantel) (TruRx)

Interceptor® Flavor Tabs® for Dogs & Cats (milbemycin oxime)(Elanco)

Iverhart Max® Chewable Tablets (ivermectin/pyrantel/praziquantel) (Virbac)

IVERHART PLUS® Flavored Chewables (ivermectin/pyrantel) (Virbac)

Nemex® Flavored Chewables (pyrantel pamoate) (Zoetis)

Panacur® Granules 22.2% (fenbendazole) (Intervet/Merck Animal Health)

PetTrust™ Plus Chewable Tablets (ivermectin/pyrantel) (Sergeant's)

Sentinel® Flavor Tabs® (milbemycin oxime/lufenuron) (Virbac)

Sentinel® Spectrum® Chewables (milbemycin oxime/ lufenuron/praziquantel) (Virbac)

Trifexis® (milbemycin oxime/spinosad) (Elanco)

Tri-Heart® Plus Chewable Tablets (ivermectin/pyrantel) (Intervet/Merck Animal Health)

Virbantel® Flavored Chewables (pyrantel pamoate/ praziquantel) (Virbac)

Toxascaris leonina: the following products are approved for the treatment of adult *T. leonina* infections in dogs:

Advantage Multi® Topical Solution for Dogs (imidacloprid + moxidectin) (Bayer Animal Health)

Coraxis™ Topical Solution for Dogs (moxidectin) (Bayer Animal Health)*

Drontal® Plus Tablets (praziquantel/pyrantel pamoate/febantel) (Bayer Animal Health)

Drontal® Plus Taste Tabs® (praziquantel/pyrantel pamoate/febantel) (Bayer Animal Health)

HEARTGARD® Plus Chewables for Dogs (ivermectin/pyrantel) (Merial)

HeartShield™ Plus Flavored Chewables (ivermectin/pyrantel) (TruRx)

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Virbantel® Flavored Chewables (pyrantel pamoate/ praziquantel) (Virbac)

*Products with approved efficacy against fourth-stage larvae (L4).

[Click here to view Parasite Product Applications.](#)

Control and Prevention

Puppies should be routinely dewormed beginning at 2 weeks of age, with deworming repeated every 2 weeks, until the animals are four to eight weeks of age and placed on a monthly product with efficacy against ascarids.

To treat potential newly acquired infections, dogs should be maintained on monthly intestinal parasite control products with efficacy against ascarids.

Efficacy of the initial dewormings, monthly control product, and client compliance should be monitored by performing a fecal examination 2 to 4 times in the first year and 1 to 2 times per year thereafter, depending on the age of the animal and its prior history of infection.

Prevention of predation and scavenging activity by keeping dogs confined to a leash or in a fenced yard will limit the opportunity for dogs to acquire infection with ascarids via ingestion of vertebrate hosts or from an environment contaminated with feces from untreated animals.

Prompt removal of feces from the yard or the litterbox will also help prevent ascarid eggs from remaining in the environment as the fecal material decomposes or is dispersed.

Enforcing leash laws and requiring owners to remove feces deposited by their dogs can protect public areas from contamination with ascarid eggs.

Public Health Considerations

Toxocara spp. are well-documented and important zoonotic disease agents. Infection with *Toxocara* spp. is most common in children and occurs upon ingestion of larvated eggs from a contaminated environment following dirt eating or other forms of pica. Although all children are susceptible to infection, some studies have shown that toxocariasis is more common in both rural and inner-city areas, and is associated with poverty and contact with breeding and/or untreated, free-roaming dogs.

Larvated eggs of *Toxocara* spp. are commonly found in soil collected from playgrounds or parks, and the eggs survive and remain infective for many years. When these eggs are ingested, the larvae they contain migrate internally in the child, resulting in disease.

Syndromes of toxocariasis include visceral larva migrans, which is usually characterized by hepatomegaly, pulmonary disease, and eosinophilia; neural larva migrans, characterized by progressive neurologic disease; ocular larva migrans, characterized by a unilateral granulomatous retinitis; and covert toxocariasis, in which chronic abdominal pain or other nonspecific symptoms develop.

Prevention of disease caused by infection with zoonotic ascarids requires preventing the ingestion of eggs from the environment. Young children should be closely monitored so that dirt eating and other forms of pica can be discouraged, particularly in public areas known to be frequented by dogs and cats.

Early and regular deworming is essential in preventing contamination of the environment with *Toxocara* eggs. Treating pets to prevent egg shedding is critical because the eggs are very hardy and long-lived in the environment. Once present, the eggs can be removed or destroyed only through extreme measures such as paving kennel areas or areas of pet defecation with concrete or asphalt, complete removal of topsoil, prescribed burns, or treatment with steam.

Selected References

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